Claims

1. Water-insoluble silicate glass powder, wherein the silicate glass powder exhibits glass particles with the following composition in percentage by weight on an oxide basis:

SiO_2	20 - 80
Na_2O	5 - 30
K_2O	0 - 5
P_2O_5	0 - 15
B_2O_3	0 - 10
CaO	4 - 30
MgO	0 - 8
Al_2O_3	0 - 7
Fe_2O_3	0 - 2

as well as conventional fining agents in conventional quantities, characterized in that the glass particles contain at least one of the following components

ZnO

AgO

CuO

CeO_2

GeO_2

TeO_2

wherein these components are concentrated in the regions of the glass particles that are near the surface.

2. Water-insoluble, antimicrobial silicate glass powder in accordance with Claim 1, characterized in that the regions near the surface contain the components in a concentration > 100 ppm and < 8 percent by weight.

3. Water-insoluble, antimicrobial silicate glass powder in accordance with any one of Claims 1 or 2, characterized in that the composition exhibits the following in percentage by weight on an oxide basis:

SiO_2	38 - 65
Na_2O	10 - 30
P_2O_5	4 - 15
B_2O_3	0 - 3
CaO	10 - 30

4. Water-insoluble, antimicrobial silicate glass powder in accordance with any one of Claims 1 or 2, characterized in that the composition exhibits the following in percentage by weight on an oxide basis:

SiO_2	50 - 80
Al_2O_3	0 - 1
CaO	4 - 15
MgO	0 - 8
Fe_2O_3	0 - 2
Na_2O	5 - 20
K_2O	0 - 2

5. Water-insoluble, antimicrobial silicate glass powder in accordance with any one of Claims 1 through 5, characterized in that the size of the particles of the glass powder is < 100 µm, < 50 µm, < 20 µm, preferably < 5 µm, especially preferably < 2 µm.

6. Water-insoluble, antimicrobial silicate glass powder in accordance Claim 5, characterized in that the particles with a size < 5 µm can be obtained by attritor grinding of the glass in water.

7. Method for production of water-insoluble antimicrobial silicate glass powders comprising the following steps:

a silicate glass with the following composition in percentage by weight on an oxide basis:

SiO_2	20 - 80
Na_2O	5 - 30
K_2O	0 - 5
P_2O_5	0 - 15
B_2O_3	0 - 10
CaO	4 - 30
MgO	0 - 8
Al_2O_3	0 - 7
Fe_2O_3	0 - 2

as well as conventional fining agents in conventional quantities is melted, after that the silicate glass ground is into glass particles, the glass particles are antimicrobially finished with one or more of the following ions

Zn

Ag

Cu

Ce

Ge

Te

by means of one or more of the following processing steps:

- ion exchange in salt baths
- application of metalliferous solutions and suspensions
- firing of saline pastes
- firing of metalliferous solutions and suspensions
- grinding of the silicate glass into glass particles in metalliferous, in particular aqueous solutions and suspensions.

8. Method according to Claim 7, characterized in that

the compositions contained in the melts, solutions and suspensions, which are carriers of Ag, Zn or Cu, comprise one or more of the following compounds:

Ag chloride

Ag nitrate

Ag oxide

Ag

Ag organic compounds

Ag inorganic compounds

Cu oxide

Zn oxide

Zn nitrate

Zn chloride

Cu, Zn organic compounds

Cu, Zn inorganic compounds

as well as all other compounds, comprising in particular all salts of antimicrobially active ions, such as e.g., Ag, Cu, Zn, Sn, which are stable at room temperature or are stable up to the temperature of the tempering or in the applied solution or suspension.

9. Method according to Claim 8, characterized in that one or more of the following ions Zn, Ag, Cu, Ce, Ge are concentrated in the regions of the glass particles near the surface.

10. Method in accordance with any one of Claims 8 through 9, characterized in that the size of the glass particles of the glass powder is < 100 µm, < 50 µm, < 20 µm, preferably < 5 µm, especially preferably < 2 µm.

11. Use of glass powders with antimicrobial glass surface produced according to a method in accordance with Claims 8 through 10 in the foodstuffs sector.

12. Use of glass powders with antimicrobial glass surface produced according to a method in accordance with Claims 8 through 10 in the household.

13. Use of glass powders with antimicrobial glass surface produced according to a method in accordance with Claims 8 through 10 in pharmacy and biotechnology.

14. Use of glass powders with antimicrobial glass surface produced according to a method in accordance with Claims 8 through 10 in the sector of cultivation.

15. Use of glass powders with antimicrobial glass surface produced according to a method in accordance with Claims 8 through 10 in the sector of displays.

16. Use of glass powders with antimicrobial glass surface produced according to a method in accordance with Claims 8 through 10 in the field of medical technology.

17. Use of glass powders with antimicrobial glass surface produced according to a method in accordance with Claims 8 through 10 in the sector of hospitals and practices.

18. Use of glass powders with antimicrobial glass surface produced according to a method in accordance with Claims 8 through 10 as glass bottom in cooling units, in particular in refrigerators.

19. Glass ceramic powder, wherein the glass ceramic powder comprises glass ceramic particles, characterized in that the glass ceramic particles contain at least one of the following components

ZnO

AgO

CuO

CeO_2

GeO_2

TeO_2

wherein these components are concentrated in the regions of the glass ceramic particles that are near the surface.

20. Glass ceramic powder in accordance with Claim 19, characterized in that the regions that are near the surface contain the components in a concentration > 100 ppm and < 8 percent by weight.

21. Glass ceramic powder in accordance with any one of Claims 19 through 20, characterized in that the source glass composition of the glass ceramic exhibits the following in percentage by weight on an oxide basis:

SiO_2	55 - 69
Al_2O_3	19 - 25
P_2O_5	0 – 1.0
TiO_2	1.0 – 5.0
ZrO_2	0.5 – 2.5
Li_2O	3.0 – 4.0
Na_2O	0 – 1.0
K_2O	0 - 0.6
Σ $Na_2O + K_2O$	0.2 – 1.0
MgO	0 - 1.5
CaO	0 – 0.5
SrO	0 - 1.0
BaO	0 – 2.5
Σ CaO + SrO + BaO	0.2 – 3.0
ZnO	1.0 – 2.2

22. Glass ceramic powder in accordance with any one of Claims 19 through 21, characterized in that the source glass composition of the glass ceramic exhibits the following in percentage by weight on an oxide basis:

SiO_2	66 - 68
Al_2O_3	19 - 25
TiO_2	2.0 – 3.0
ZrO_2	1 – 2.5

Li_2O	3.0 – 4.0
Na_2O	0 – 1.0
K_2O	0 - 0.6
Σ $Na_2O + K_2O$	0.2 – 1.0
MgO	0 - 1.5
CaO	0 – 0.5
SrO	0 - 1.0
BaO	0 – 1.0
ZnO	0 – 2.0

23. Glass ceramic powder in accordance with any one of Claims 19 through 22, characterized in that the size of the particles of the glass ceramic powder is < 100 µm, < 50 µm, < 20 µm, preferably < 5 µm, especially preferably < 2 µm.

24. Glass ceramic powder in accordance with any one of Claims 19 through 23, characterized in that particles with a size < 5 µm can be obtained by attritor grinding of the glass in water.

25. Method for the production of antimicrobial glass ceramic powders comprising the following steps:
a source glass is melted,
after that the source glass is ceramized into a glass ceramic
after that the glass ceramic is ground into glass ceramic particles,
the glass ceramic particles are antimicrobially finished with one or more of the following ions

Zn
Ag
Cu
Ce
Ge
Te

by means of one or more of the following processing steps:

-ion exchange in salt baths

-application of metalliferous solutions and suspensions

-firing of metalliferous solutions and suspensions

-firing of saline pastes

grinding of the glass ceramic into ceramic glass particles in metalliferous, in particular aqueous solutions and suspensions.

26. Method according to Claim 25, characterized in that

the compositions contained in the melts, solutions and suspensions, which are carriers of Ag, Zn or Cu, comprise one or more of the following compounds:

Ag chloride

Ag nitrate

Ag oxide

Ag

Ag organic compounds

Ag inorganic compounds

Cu oxide

Zn oxide

Zn nitrate

Zn chloride

Cu, Zn organic compounds

Cu, Zn inorganic compounds

as well as all other compounds, comprising in particular all salts of antimicrobially active ions, such as e.g., Ag, Cu, Zn, Sn, which are stable at room temperature or are stable up to the temperature of the tempering or in the applied solution or suspension.

27. Method according to Claim 26, characterized in that one or more of the following ions Zn, Ag, Cu, Ce, Ge are concentrated in the regions of the glass ceramic particles that are near the surface.

28. Method in accordance with any one of Claims 25 through 27, characterized in that the size of the glass ceramic particles of the glass ceramic powder is < 100 µm, < 50 µm, < 20 µm, preferably < 5 µm, especially preferably < 2 µm.

29. Use of glass ceramic powders with antimicrobial glass ceramic surface produced according to a method in accordance with Claims 25 through 28 in the foodstuffs sector.

30. Use of glass ceramic powders produced according to a method in accordance with Claims 25 through 28 in the household.

31. Use of glass ceramic powders produced according to a method in accordance with Claims 25 through 28 in pharmacy and biotechnology.

32. Use of glass ceramic powders produced according to a method in accordance with Claims 25 through 28 in the sector of cultivation.

33. Use of glass powders produced according to a method in accordance with Claims 25 through 28 in the sector of displays.

34. Use of glass powders produced according to a method in accordance with Claims 25 through 28 in the field of medical technology.

35. Use of glass powders produced according to a method in accordance with Claims 25 through 28 in the sector of hospitals and practices.

36. Use of glass powders produced according to a method in accordance with Claims 25 through 28 as glass bottom in cooling units, in particular in refrigerators.